What the Author Should Know About New Printing Technology*

Victor Strauss

Since the early 1960s typesetting has been in a technological revolution which is still in progress and is far from even leveling off. Now manufacturers of composition systems, publishers and printers, and even some writers have begun to ask how precisely authors will be affected by this new technology and whether it would not be best for all interested in book publishing to get the author involved at this stage of the computer revolution.

The shotgun marriage between printing and data processing

In the late 1950s computer scientists began to apply the computer to composition and in the early 1960s the printing and publishing industry found itself suddenly face to face with the computer. This second great composition revolution differed in its abruptness from the first, which took decades and culminated in Mergenthaler's invention of the Linotype in 1884 and Lanston's development of the Monotype at about the same time. That first revolution was well within the intellectual and technical scope of printing craftsmen whereas the second, the computer revolution, was based on scientific premises that were as new as they were strange to printers.

Almost overnight the composition industry changed from a staid business into one that had received the divine spark of electronics. Since printers were no better prepared for the new technologies than computer people were for the needs of the graphic arts, the results were confusion, frustration because of language differences, and disappointed expectations. But the image makers and newsmongers had a wonderful time. They were the ones who really could enjoy themselves.

Computerized composition is a broad and highly technical subject. I will merely point out some of the tasks and problems without using more jargon than absolutely necessary. One of the newer terms is end-of-line decisions. In traditional line casting the operator looks at the manuscript as he fingers the keyboard, working much like a touch typist. But the Linotype operator must also take care of a number of functions related to the copy and its appearance as well as to machine performance. In particular he must make end-of-line decisions. This means that he must decide whether he should divide a word at the end of a line or space the line out without using the available space for an extra syllable; and if he divides a word he must do this according to the dictionary which is used in

---

* Reprinted from the October-November, 1970 Authors Guild Bulletin by permission of the author.

The glamour of CRT composition

CRT (cathode ray tube) or electronic composition became practical in the late 1960s. (Cathode ray tube is the name given your TV screen in the physics lab.) The main feature of CRT composition is, as you would expect, speed. Here I must introduce the L/M concept. L/M stands for lines per minute, and it is used to express the relative speeds of different systems. (The line in question is an 8 point 11 pica line, as used in an average newspaper column.) An operator-fingered linecasting machine produces, say, 3-4 L/M; a high-speed tape-operated machine yields approximately 15 L/M and a CRT, incredible as it may sound, can easily deliver 2,000 L/M.

This means that a 100,000-word book can be composed on a CRT in half-an-hour, give or take a few seconds. Project this figure further and you find that you need approximately ten such books per working day, or 2,500 per year if you want to keep this Moloch fully satisfied. And that is at present the greatest problem of CRT composition: to provide the necessary input for the machines.

What does input mean? So far it looks as if the CRT does the job all by itself, as if composed pages jump out of it with no more preparation than Zeus needed when he let Pallas Athene jump out of his head, fully armed and ready to play her role in Greek mythology. Our electronic mythology is just as incredible; fortunately we can get down to earth and try to understand what is really happening.

Like the Monotype caster, a tape-operated linecasting machine, and a number of photographic composition systems, the CRT depends on input before it can produce the final output, the wanted composition. The input for all these systems is prepared in the form of narrower or wider paper ribbons and of various kinds of magnetic tape. These tapes contain all information needed for the operation of the output equipment in a coded form.

Input, the bottleneck of CRT composition

Depending on the nature of the work, input is more or less difficult, or - which amounts practically to the same - time-consuming. A convenient rule of thumb is to assume that it takes about 40 input hours for one hour of CRT operation. In complicated work this time may be increased by 50 per cent and even more.

At present most input is prepared on tape perforators - typewriter-like machines that produce punched paper tape, as already mentioned; magnetic tape input equipment is gaining ground, particularly that rented or sold by IBM, but also by other companies. Some input is arrived at by optical character recognition (OCR) of typed and even printed material, and advanced technologists speak of the

Editing games played in publishing

There are several kinds of editors in a larger book publishing firm. One group, comparable to buyers in department stores, are literary entrepreneurs who have a flair for the opportunities of the marketplace often coupled with shrewd judgment of a writer's capabilities. They are called editor-in-chief, senior editor, or even acquisition editors. Their role in the success of a publishing company cannot be overstated, but they are outside the subject to be discussed here.

When the manuscript is delivered the writer meets another type of editor, often called copy editor or production editor. This person is concerned with the detail of writing, grammar, punctuation, abbreviation, capitalization, or generally speaking with making the text (and illustrations, if any) conform to the house rules. As everybody knows, modern mass society has an ever-growing, almost insatiable appetite for writing. The demand far outruns the supply, if not of persons masquerading as writers, then certainly of halfway competent or really good ones. Not surprisingly, a considerable number of marginal cases, people who under different conditions would concentrate their energies elsewhere, become writers.

Publishers have learned that poorly written books sell less than well-written ones and have developed editing systems to improve the quality of their books. I am referring here more to text books and technical manuals than to other kinds. But even in biographies and other non-fiction books there may be a lot of work for a copy editor. He, or she, must do what the author was supposed to do in the first place: make the manuscript ready for the printer. The edited manuscript either can be sent directly to the compositor or it can be returned to the writer for his approval. Either method has its advantages and its shortcomings. I am told that there are writers who are pleased with the corrections made by editors and who return the manuscript not only with their approval but also with thanks. And since my informants are honorable people there must be such instances. But I believe that most people dislike intensely to have their language corrected, and those likely to accept corrections on their merits usually need them least, because they are the true professionals. But these professionals are particularly irked if they are asked to accept inept, pedantic corrections made by recent English graduates in imitation of their teachers.

The psychological background of these games between the literary governesses and their often unruly charges cannot be pursued here. But what must be pursued is the appearance of the manuscript as it finally arrives at the compositor. It looks like a neatly ploughed field trampled over by a horde of drunks - a real mess. Words and sentences are now crossed out in one color, marked "stet" in another, additions are written in longhand, and directed with

For centuries it was impossible to separate the technical from the intellectual side of composition. When Tolbert Lanston invented the Monotype in 1887, he divided his new system into the keyboard and the caster and thereby made the division of the two sides possible. The keyboard was and still is used for encoding a paper ribbon with the intellectual content of the composition. This paper ribbon then is put on the caster where it controls the casting of justified lines consisting of individual type characters. Lanston hoped that writers would learn to operate the keyboard but this wish did not come true.

The separation of keyboarding from casting was applied to the Linotype in the 1930s. Again it was hoped that journalists would operate the keyboards of the TTS (Teletypesetter System) and again these hopes were disappointed. Even though TTS perforators are easier to handle for writers than Monotype keyboards, this function was in practice left to craftsmen who copied text rather than to the writers who originated it. The next experiment in making keyboarders out of writers was made approximately 30 years later. In the early 1960s,keyboards that looked and worked like typewriters, equipped for hardcopy, were used to prepare unjustified tape for the computer. It appeared logical to ask journalists, reporters, to file their copy in this manner but this logic too was short of breath; it got nowhere.

You see that these experiments of the writer as part of manufacturing were repeated by different generations. Here as in other things each succeeding generation had to find out for itself because it did not have the experience of its fathers.

Different people will draw different conclusions from these failures. Mine is that it is impossible to concentrate on anything else when you are writing and that every system which deflects the attention of the writer from his work must fail. I personally believe that that is the way it should be. A writer's job is to write, and to concentrate all his energy on writing. It cannot be the writer's job to subordinate writing to the preparation of input. Here as elsewhere those who want to kill two birds with one stone will kill none and probably smash some windows.

But I also believe that the new technology can be used to help us in our work as writers, relieve us of much of the tedious detail of editing, eliminate time wasted in proofreading, and, not least, reduce the senseless time lag between writing and publication. Much of the new technology is still in flux and can therefore still be influenced in its direction.

The crux of computer composition

The same technological revolution that gave us hot metal machine composition (Linotype, Intertype and Monotype) also

refrain from rewriting because he is afraid of the expenses caused by the odious a.a.'s.

When the final manuscript is established it is so to speak frozen on the tape. A final transcript of this frozen tape is made least expensively by computer printout equipment, which shows writer, editor, designer and compositor the exact text. No proofreading for content is necessary from then on. There will be no new keyboarding and therefore no mistakes. (Machine errors are so rare that they can be neglected at this stage of our discussion.) There may be an inspection of the composition though, to make sure that it is up to the typographic standards of publisher, designer or printer.

Finally I want to mention that the computer could easily take over some of the most boring and also most time-consuming chores of copy editing. I am referring here to the consistency in spelling,abbreviation, and so forth, which causes so much shaking of heads among our good, hard-working copy editors. Authors can be inconsistent (said less politely: "sloppy") and misspell words or mishandle compounding. Few items are as annoying as the little hyphen. Be consistent! make up your mind, and stick to your decision! Is it copy editor? copy-editor? or copyeditor? As all three versions are defensible and only the bluest of the bluebloods will be immediately offended by any, even the best copy editor is apt to overlook some infraction of these artificial rules and thereby join the ranks of the inconsistents. But the computer is not open to such human weakness; if you instruct it to join copy and editor with a hyphen, a hyphen will join them forever.

To sum up: The new technology in printing, if properly understood, can help us write our books, make our books better, reduce the time lag between writing and publication, and relieve us of much of our editing nitty gritty and all of our proofreading. If we understand what it can do for us we can greatly benefit by it.

gave us the typewriter. Either development is a departure from hand composition, and different as they are in most respects they have both one new common denominator which did not exist in hand composition: the keyboard as originally used on musical instruments. I have already sketched the several efforts made to combine writing and keyboarding and explained why they all failed. The new technology will change this situation decisively, because it is so flexible, so adaptable that it has become possible to divide the Siamese twins of composition, its intellectual and its technical side. This is the crux of the contribution made by the computer to composition. This truly revolutionary point is, unfortunately, much less ostentatious or ostensible than the fabulous speed of CRT composition. But ever more people are beginning to see that this is the point where the lever must be applied.

Another related point needs mention. A secondary, though quite important reason why it is impractical to use writers for input preparation is that the input tapes must be nearly perfect and that the correction possibilities were rather limited in older systems. Computers differ essentially in this respect; they are excellently adaptable to deletions, additions and shifting of copy, hence to editing. And their main advantage is that the already established text will not be accidentally changed because it is electronically transferred from version to version, which is quite different from passing through composition where it must be rekeyboarded and is also otherwise open to changes for the worse simply by the mechanics of handling. It has become not only possible but also entirely practical to arrive at a clean manuscript on tape and to set type from such a tape without interposition of a new keyboarding. To avoid all misunderstandings, I want to add that it is also unnecessary to introduce codes relating to the technical side of composition during this phase of the work. How the necessary function codes are to be entered is not of interest to writers, but is, rather, the job of systems designers and technicians.

Is proofreading a necessity for the quality of books?

Some authors and editors shudder to think that their books will be printed following the manuscripts with no proofreading. They assume that the final manuscripts for composition without proofreading would be of the same nature as those turned over to compositors under present conditions. But the manuscripts to be used in the future will be entirely different. Then all corrections by writer or editor will be made, and repeated so often as found necessary by a writer, before the manuscript will be released for composition. The quality of manuscripts will be greatly improved for several reasons. One of them is that the time needed for electronic composition from existing input tapes will be reduced from months to days or weeks. This time saving can be invested in rewriting and editing. Secondly nobody will have to work under the pressure of printer's schedules and need to

graceful loops or arrows to their proper places; paragraphing is changed, and slips, marked insert at A or No. 1, are clipped and stapled to the pages. These corrections are evils which continue to beget more evils in the course of production. They have a cost-increasing effect on input, and cause trouble during proofreading. Ideally, a manuscript should be perfect, with no corrections at all.

To avoid the back and forth traffic between writer and editor some publishers send the copy-edited manuscript for proofreading. If he has the temperament of a saint he will find this procedure to his liking because liking it will prove that he is far advanced on the way to salvation. If, like most of us, he is an ordinary sinner he will blow his top and feel cornered and abused. Nobody likes to be faced with accomplished facts, and to be confronted with a fait accompli where he has by law and tradition the right of decision is particularly galling to the writer.

If he is young and inexperienced, or just inexperienced, he has a surprise coming: whenever he changes the copy editor's gems to his own language, or, after his anger has died down, to better language, stimulated by the editor's corrections, he runs the risk of having to pay for these changes as a.a.'s. And he will learn to his chagrin that a.a.'s are much more expensive than he thought. (An explanation whould be lengthy, so let me just say that service costs always come very high.)

As you can see, writing, editing, composition, and proofreading are all closely interlocked. Our whole editing and proofreading system is actually based on the dual nature of composition which must now be explained.

The dual nature of composition

All composition is done by assembly. In hand composition the compositor assembles individual type characters and spaces them into words and lines, into paragraphs,and on into pages. More modern methods have changed composition technology from the bottom up, but they are still based on the assembly principle, in CRT composition even more so. This is one side of composition which has of course its own technical rules and values.

If composition were an assembly method like many other industrial processes, say those whereby automobiles are put together, things would be much easier. Unfortunately, this assembly method has also an intellectual side. The compositor must be a literate person. For centuries he was expected to be an excellent speller and sure of his grammar, particularly of punctuation and capitalization. These abilities were, and often still are, necessary because writers are by and large not too attentive to the detail of their manuscripts. The compositor was and still is in many cases as much responsible for the grammatical correctness of composition as for its technical aspects.

great possibilities of electronic voice recognition which would go directly from dictation to computer tape. I am not up on my reading of science fiction; otherwise, I would know more about man's capability of growing electrodes right out of his skull like the horns of Michelangelo's Moses.

To return to the subject in hand, input depends still more on human beings than on machines, more on the ten fast fingers and the power of concentration of the operator than on the equipment. Another factor that has a considerable influence on input is the preparation of manuscript.

Now we have arrived at the point which is of greatest interest to us as writers, namely how can this new technology be applied to our benefit? How can it help us to improve the quality of our books? Can it really relieve us of some of the drudgery of writing and editing?

These questions cannot be answered without some comments on the whole complex of writing, editing, and proofreading as it is generally practiced.

The writer's literary rights and obligations

The writer's literary rights and obligations are not the same in all segments of the publishing industry, and there is a considerable difference between staff, or employed, and free-lance writers. The members of the Authors Guild are primarily free agents and the following discussion is written with this fact in mind.

The author is, legally if not factually, the equal of the publisher with whom he enters into a contract. From the publisher's point of view he is a supplier of manuscripts. One of his obligations is, according to tradition, the delivery of a completed manuscript, ready for the printer. The publisher may want to do minor editing, and he may suggest, and even request text changes, but the author still has the last word.

In addition to these literary rights and duties the author, traditionally, also has the obligation to read proof. Proofreading, which is technically part of quality control and has the purpose of making sure that the manuscript is correctly duplicated in type, offers the author, psychologically, an invitation to revise, rewrite or generally improve his book. Unfortunately, these changes, known as author's alterations, or a.a.'s, are costly. Publishing contracts provide that the publisher will only pay for a minimum of a.a.'s and the author is liable for all expenses beyond this point.

That's how things are in theory; now let me take a look at our actual practices.

his composing room, or the dictionary that is especially prescribed for a job.

Computerized hyphenation and justification perfected

The first step in computerized composition was the delegation of these end-of-line decisions to the computer. Now the manuscript is transcribed on typewriterlike equipment which prepares a punched paper tape or, more recently, an encoded magnetic tape suitable for processing by the computer. The equipment may be capable of producing a typed record, known as hardcopy; if it does not have this capability, it is called a blind tape perforator. Now the operator does not divide words at the end of a line but leaves this step to the computer. Typing unencumbered by end-of-line decisions goes faster.

After hyphenation and justification programs had been perfected, the computer was used for page makeup, the operation whereby the pages of a book are determined. Page makeup is known as pagination by computer composition people.

Pagination or page makeup still in its beginning

Page makeup can be relatively simple and it can be quite difficult. Running heads and folios must be inserted, and there are certain typographic rules that must be observed, depending on the design standards of a publisher or a composing room. At the time of writing things are in flux: there are some pagination systems that work well; in certain cases existing programs need adaptations which may be time and money-consuming, but by and large pagination programs of text only, without illustrations, seem to present no major problem anymore.

The next big step will be the computerization of text in combination with pictures. Line illustrations are already included in some systems; shaded pictures such as wash-drawings or photos, which must be converted into halftones for printing, are still in the laboratory or experimental stage, and full-color images are also well advanced even though there are no publicly known operating programs for combining them with text. But there is little doubt in the minds of the experts that pagination programs for combining text with pictures are bound to make their appearance within the next five years.

You can see that the computer, in its attack on printing and publishing, is taking position after position. And it must at least be mentioned that the computer has a great deal to offer in editorial functions such as indexing, extracting, rearrangement of material and even in programmed reorganization of the format. (This last point means changing the format of a book for different purposes or markets, say from hard cover to paperback.) But no other development has played as much on the imagination of the publishing industry as CRT or electronic composition.